US005716283A

United States Patent [19]

Simpson et al.

[11] Patent Number: 5,716,283

[45] Date of Patent: Feb. 10, 1998

[54] **PRACTICE BALL SYSTEM FOR TRAINING IN THE PLAYING OF POOL AND POCKET BILLIARDS**

[75] Inventors: **Thomas E. Simpson**, Dublin; **Joseph H. Oshins**, Columbus, both of Ohio

[73] Assignee: **Elephant Balls, Inc.**, Dublin, Ohio

[21] Appl. No.: **507,702**

[22] Filed: **Jul. 26, 1995**

[51] **Int. Cl.**[6] **A63B 37/00**

[52] **U.S. Cl.** **473/2**

[58] **Field of Search** ..... 473/2, 52, 253, 473/254, 251, 252, 40; 273/60, 26 R, 29 A, 56, 61 A, 58 C, 58 R, 58 A, 61 R, 411, 65 R, 72 R, 73 R, 88, 108, 125

[56] **References Cited**

U.S. PATENT DOCUMENTS

513,876	1/1894	Burt	473/52
666,333	1/1901	Stevens	473/52
984,463	2/1911	Beltran	473/52
1,108,441	8/1914	Hubbell	473/52
1,118,727	11/1914	Bibeault	473/52
3,231,278	1/1966	Boulanger	273/411
3,466,038	9/1969	Hill	473/40
3,504,914	4/1970	Bradbury	473/125
3,993,305	11/1976	Nicholson	473/2
4,116,439	9/1978	Chavarria	473/52
4,345,759	8/1982	Nims	273/65 R
4,526,368	7/1985	Furda	473/52
4,546,975	10/1985	Nims	273/65 R

FOREIGN PATENT DOCUMENTS

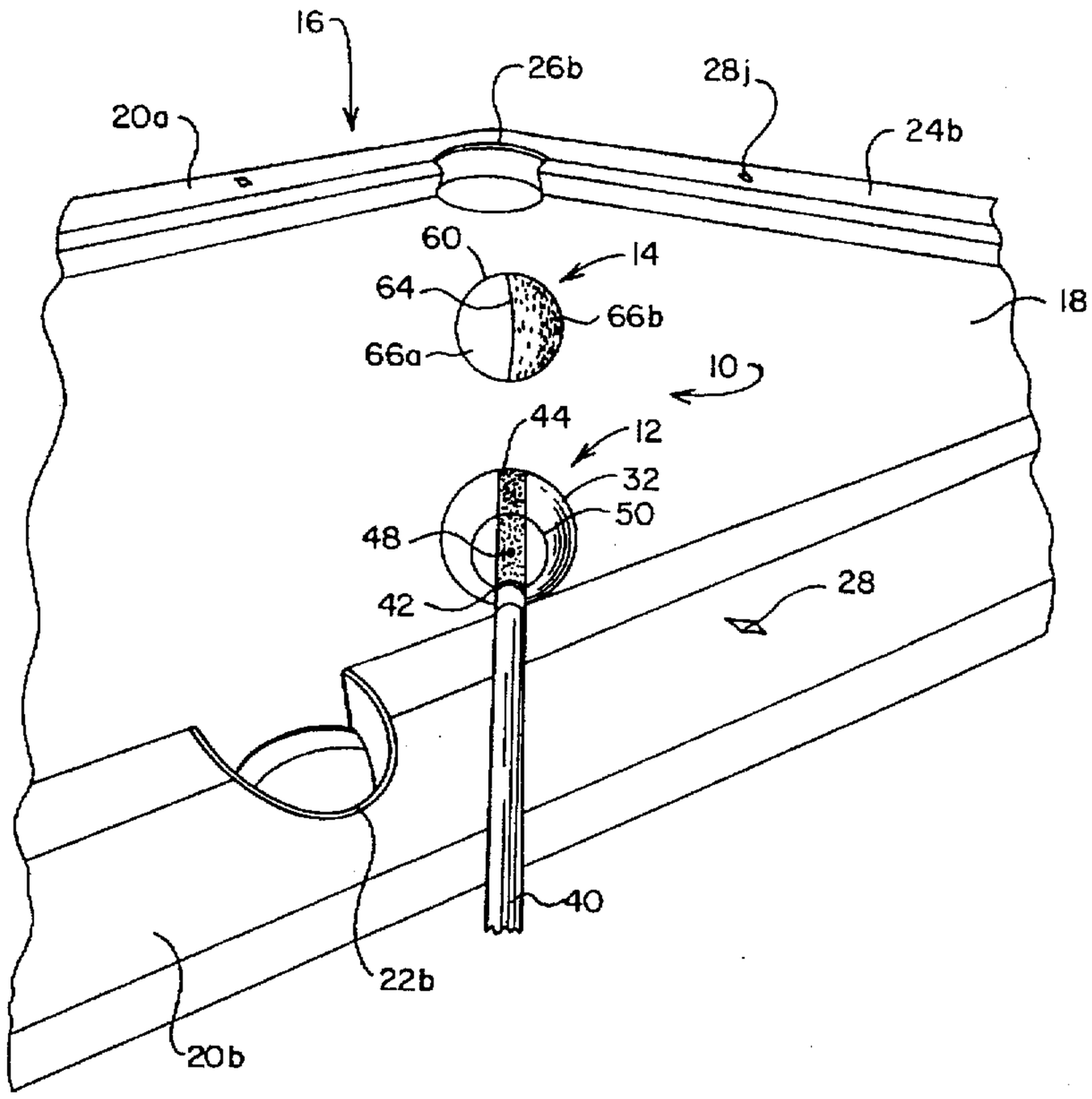
317138	8/1929	United Kingdom	273/58 A

Primary Examiner—Theatrice Brown
Attorney, Agent, or Firm—Mueller and Smith, LPA

[57] **ABSTRACT**

A practice ball system for training in the playing of pool or pocket billiards. The system includes a cueball having a generally spherical outer surface extending about an axis of revolution circumscribed by a central meridian, and which is movable along a playing surface from impact by a cue having a tip of a given outer diameter. The cueball has first indicia on the outer surface defining the central meridian which is visually perceptible as the ball is moving along the playing surface for discerning the rotation of the ball. The system also includes an object ball having a generally spherical outer surface extending about an axis of revolution circumscribed by a central meridian, and which is movable along a playing surface from impact by the cueball. The object ball has a first hemisphere having an outer surface of a first color, and a second hemisphere having an outer surface of a second color generally contrasting with the first color. The first and second hemisphere meet along a circular locus defining the central meridian of the object ball, which meridian is visually perceptible as the ball is moving along the playing surface for discerning the rotation of the ball.

21 Claims, 2 Drawing Sheets



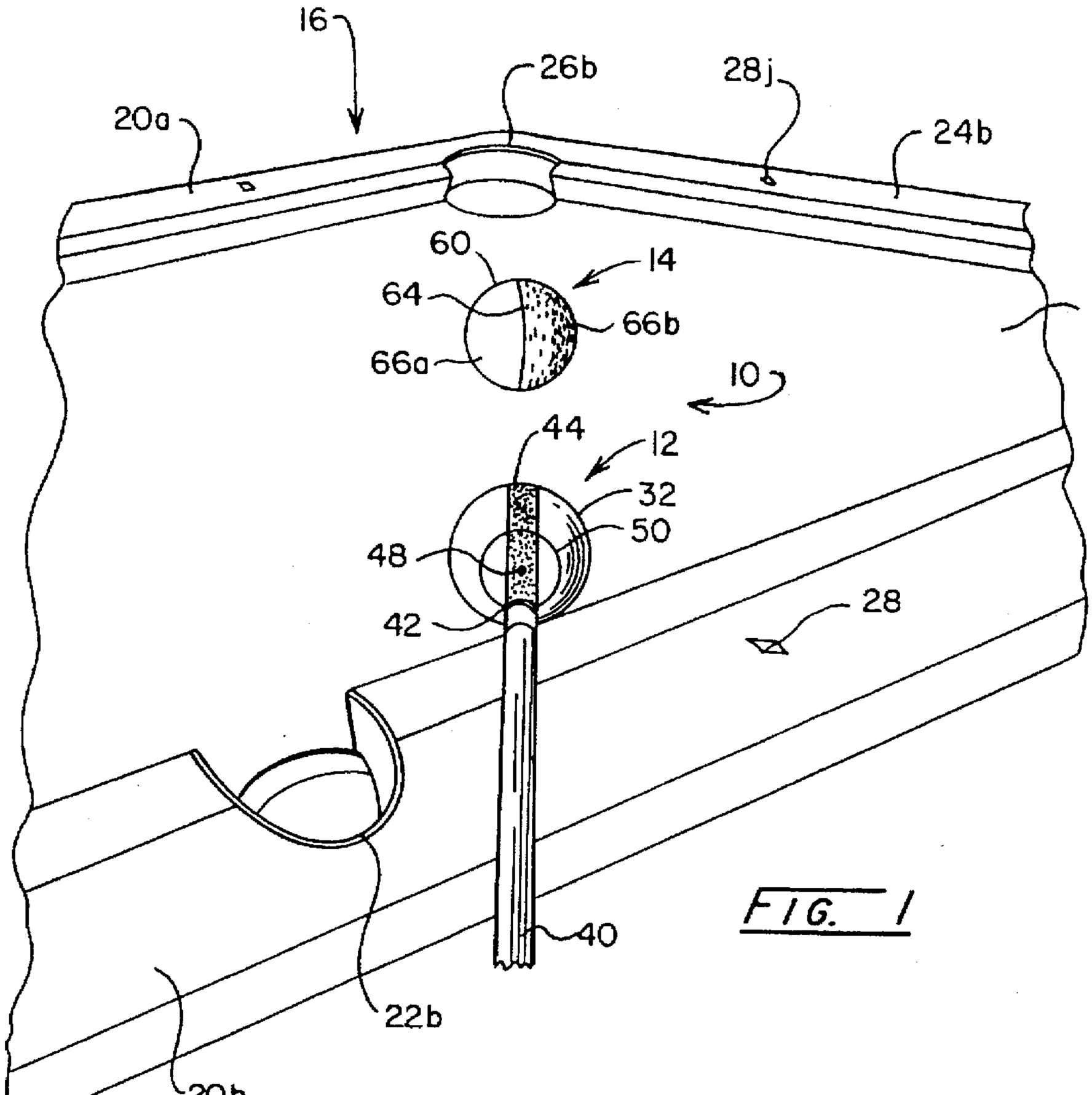


FIG. 1

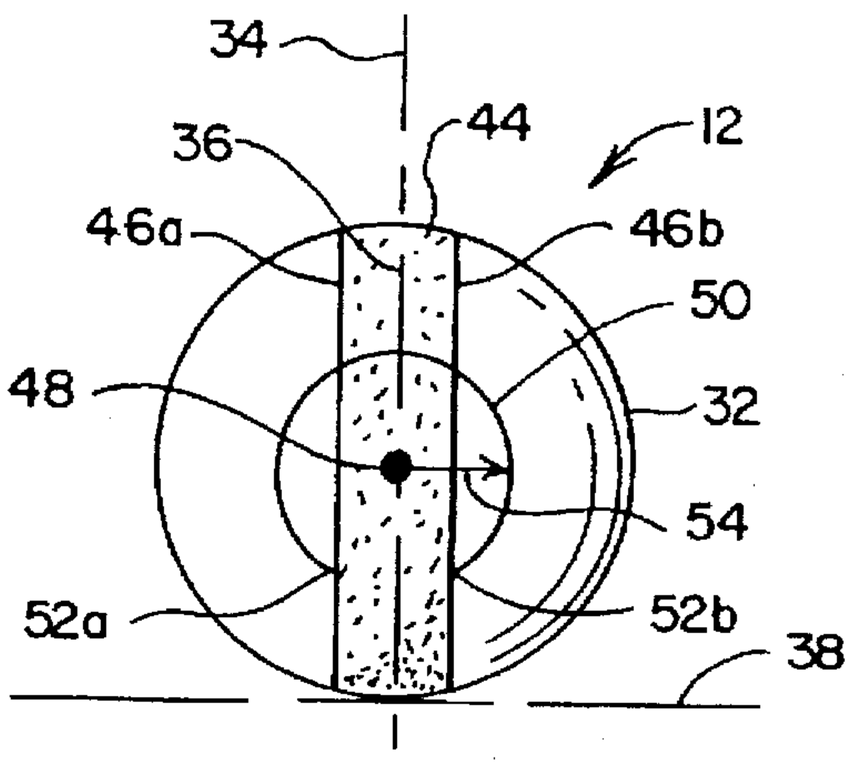


FIG. 2

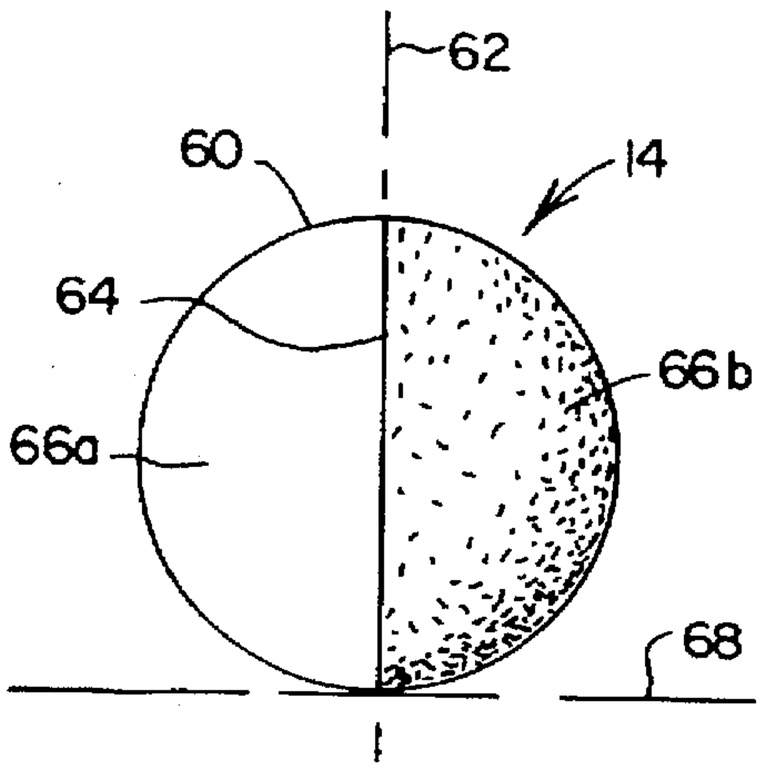


FIG. 3

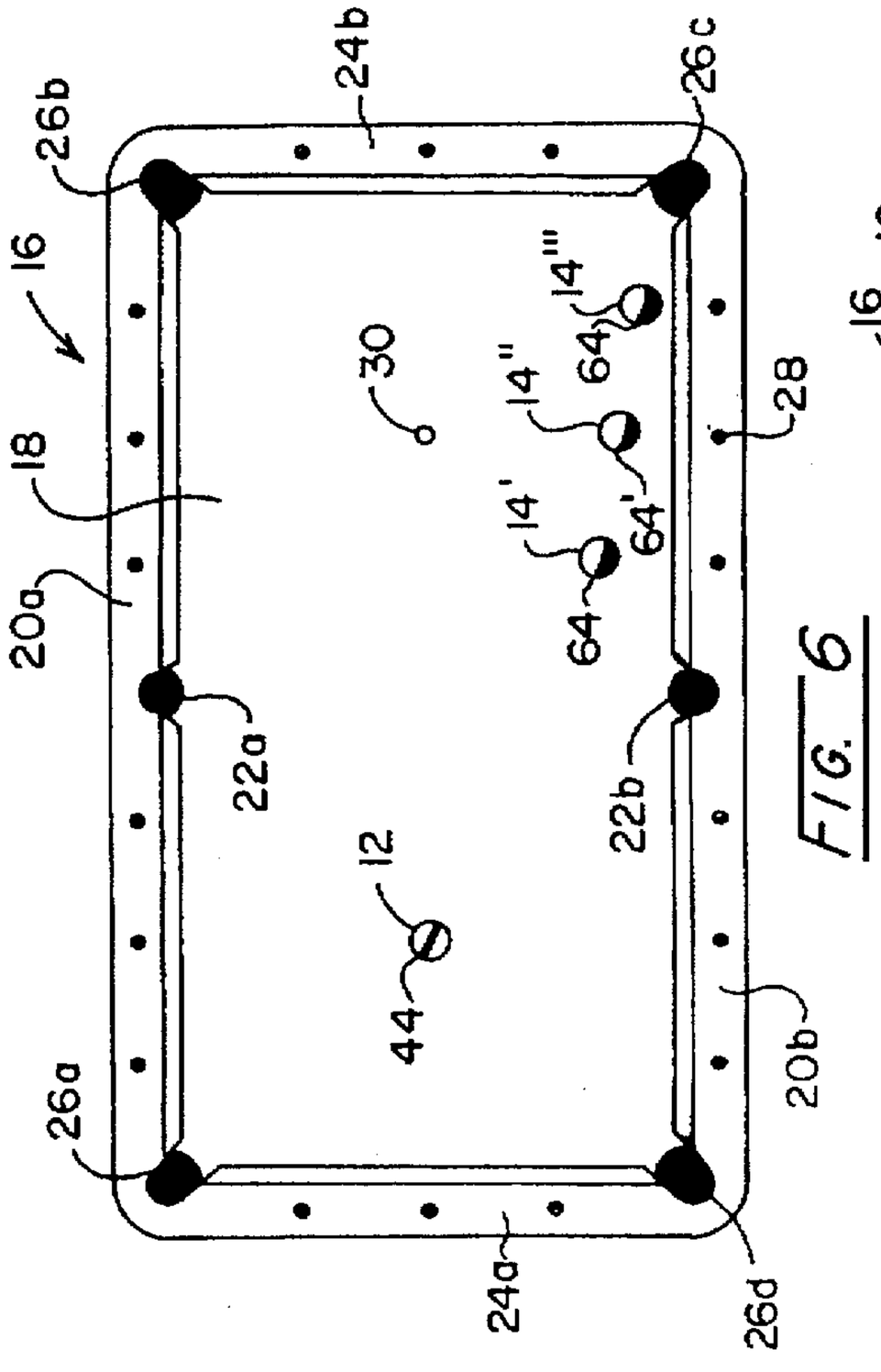


FIG. 6

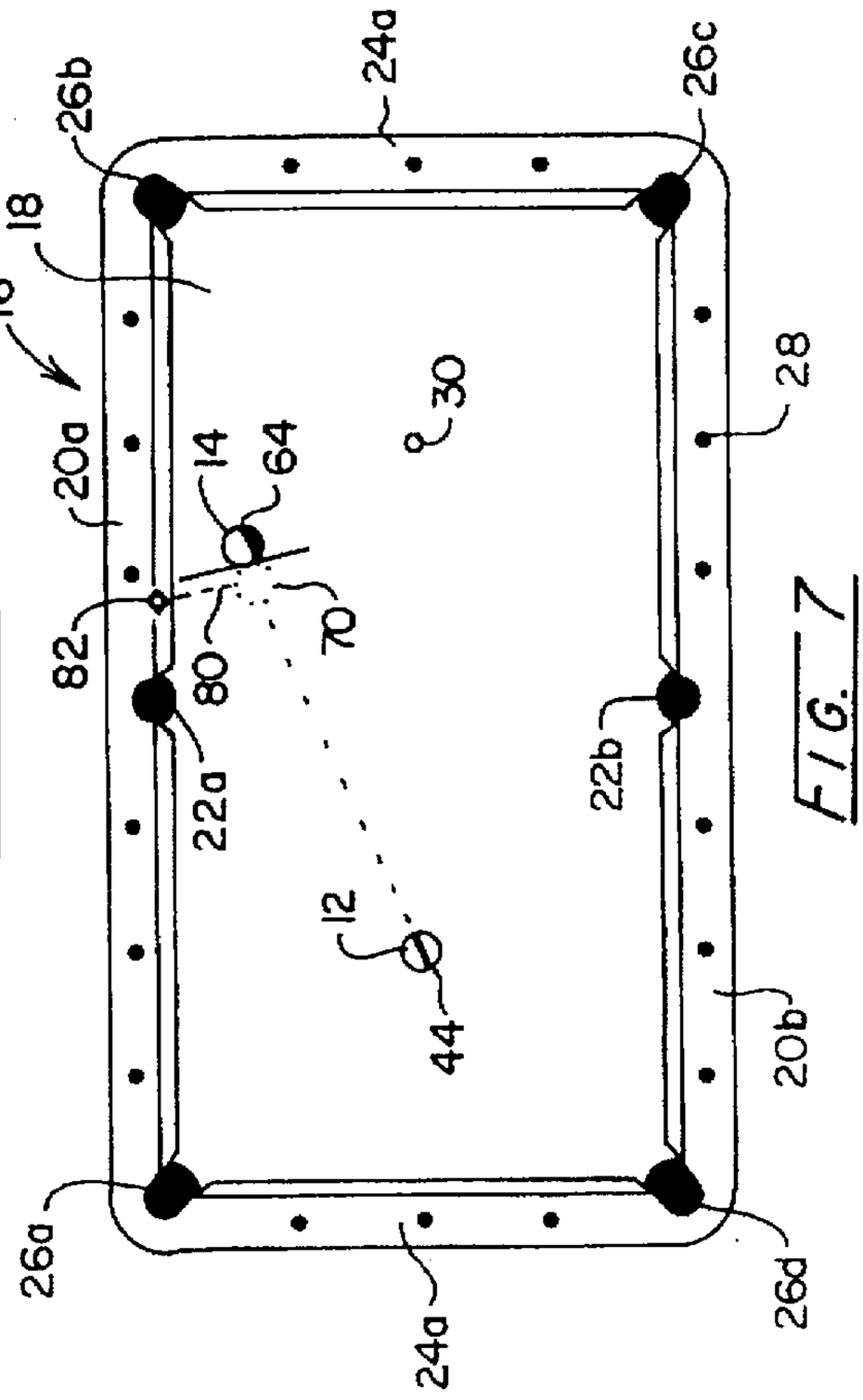


FIG. 7

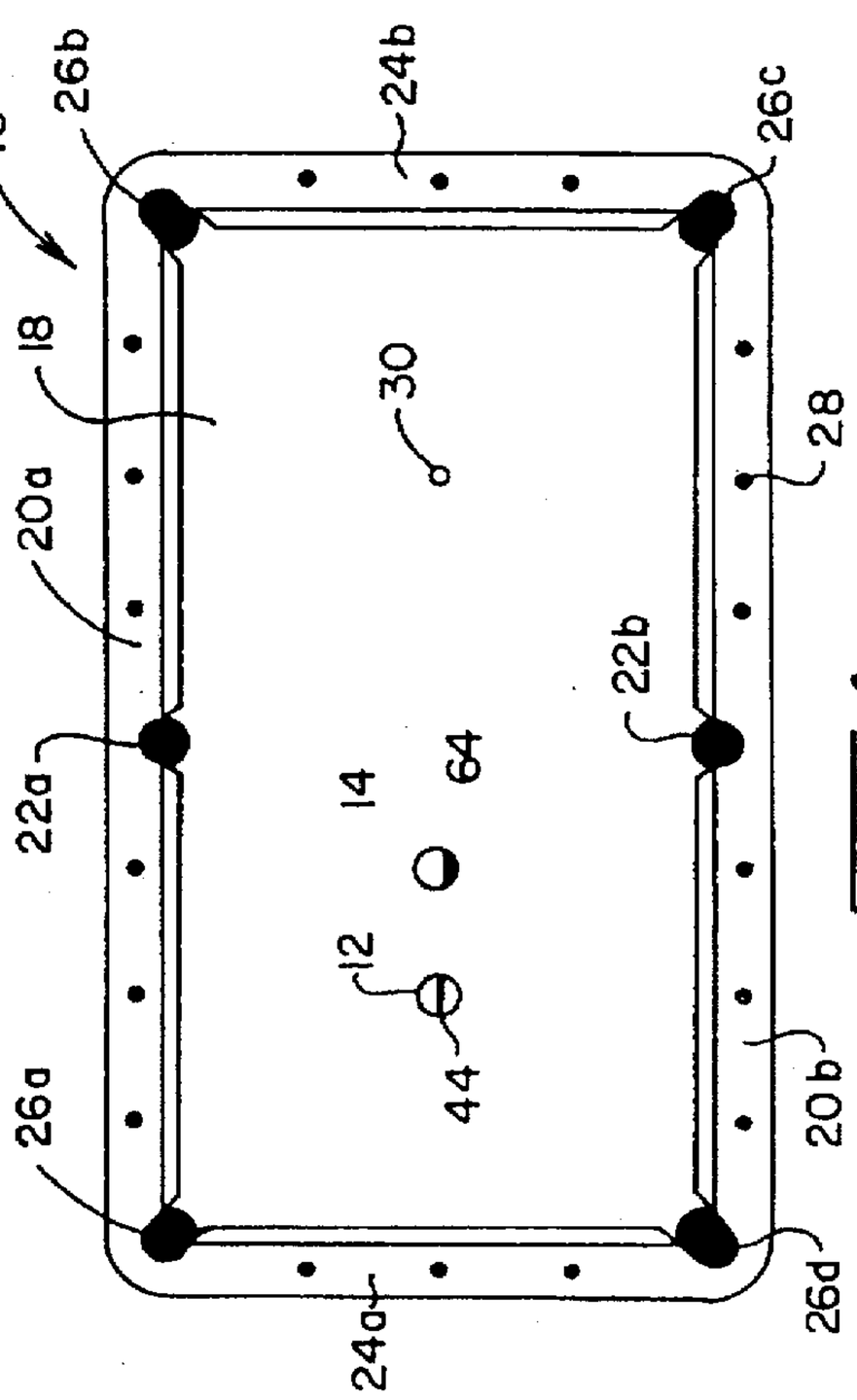


FIG. 4

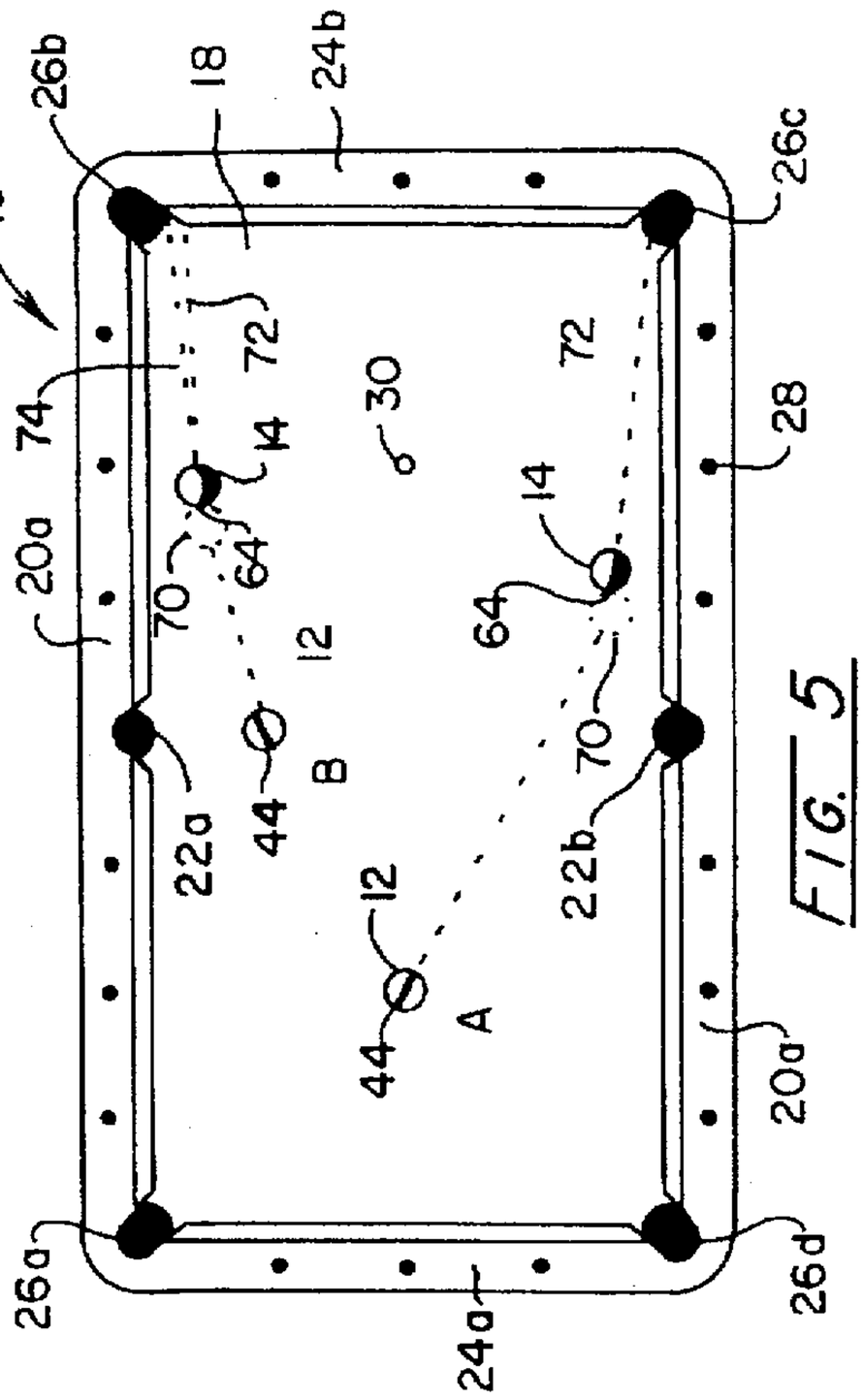


FIG. 5

PRACTICE BALL SYSTEM FOR TRAINING IN THE PLAYING OF POOL AND POCKET BILLIARDS

BACKGROUND OF THE INVENTION

The present invention relates broadly to a training system for the playing of pool and pocket billiards which utilizes practice cueball and object balls having indicia providing visual data relating to aiming and the effect of the stroke on the motion of the balls.

On one level, the game of pool, which is also known as pocket billiards, may be enjoyed as a relaxing pastime played amongst friends or family. On another level, pool may played as a competitive sport requiring a mastery of aiming, positioning, speed, spin, cut, combinations, carom, bank, deflection, draw, follow, squirt, stun, natural roll, center-ball english, throw, and other cuestick and ball phenomena.

Indeed, one of the most fascinating and often misunderstood aspects of pool is the relationship of physics to the geometry of the game. Most players tend to think of the interaction of the balls and rails as governed by a set of fixed geometric principles, and this would be true if the motion of the balls had no spin, momentum, or acceleration components. Balls do bounce, spin, and roll, however, making pool more of a game of physics than geometry.

A ball may be considered to be rolling naturally when traveling the length of its circumference per revolution. In may instances, however, the ball cannot be characterized as rolling naturally. With a draw shot, for example, the cueball actually is spinning backwards and skidding across the table into impact with the object ball. With other shots, the cueball may be both rolling with top spin and skidding such that it travels the equivalent of two or three circumferences in one revolution. It is known that some skidding will occur with all center ball or low hits, and, with an elevated cue, even on high ball hits. A center ball hit at medium speed will have some skid before assuming a natural roll.

If rolling when striking an object ball, the cueball thereafter will tend to continue to roll. On a flush hit, a rolling ball will follow the object ball. On an angled hit, the cueball will carom off at an angle, but also will continue to roll forwards. Likewise, if the cueball is skidding but spinning backwards when striking an object ball, the cueball will back up on a flush hit, or deflect at a greater angle on a cut shot. If skidding without either topspin or backspin when striking an object ball, however, the cueball will deflect at a 90° angle off an object ball. As is apparent, the physical combination of angular deflection and rolling momentum makes the exact path of the cueball difficult to predict accurately even for experienced players.

Although the physics of the game undeniably complicates predicting and understanding the effects of any particular shot, such complexity contributes to making pool such a rich and enduring sport, and a never-ending challenge for most players. For those wishing further insight on the fundamentals and science of the game, reference may be had to the following publications, the disclosures of which are expressly incorporated herein by reference:

Koehler, Jack H., "The Science of Pocket Billiards," Sportology Publications, Laguna Hills, Calif. (1989).

Byrne, R., "Byrne's Standard Book of Pool and Billiards," Harcourt, Brace, Jovanovich, San Diego, Calif. (1987).

At whatever level the game is played, it is necessary for the player to understand how the cueball behaves when stroked, and how the object balls behave when impacted by the cueball. In this regard, and especially given the complex interaction between the geometry and physics of the game, visual feedback from the balls is particularly important in conditioning the mind and body of the player to develop a sense of what will happen on any particular shot. The relatively high speed and spin of the cueball and object balls, however, make it difficult for most players to perceive anything but the crude results of each shot. This difficulty is intensified with respect to the cueball as its solid white color makes it almost impossible for the player to see the spin, slide, or roll of the ball, or to locate the center of the ball for aiming. Moreover, the chalkmark which is transferred to the cueball from the tip of the cue may provide the player with valuable information as to whether the actual stroke contacted the cueball where intended. The absence of any reference points on the surface of a standard cueball, however, effectively precludes the player from gleaning any meaningful information from the chalkmark.

In view of the foregoing, it will be appreciated that practice systems and other aids for training in the playing of pool would be well-received by players of all skill levels. A preferred system would be economic and easy to use, and would provide the player with immediate visual feedback as to the effect of each shot.

BROAD STATEMENT OF THE INVENTION

The present invention is addressed to a training system for the playing of pool and pocket billiards which utilizes a practice cueball and object ball having indicia supplying visual data to the player relating to aiming and to the effect of the stroke on the motion of the balls. In combining improved sighting and alignment capabilities with immediate visual feedback, the system allows the player to select a proper aiming point and to discern immediately how close the actual stroke came to the selected aiming point. After the stroke, the indicia provided assists the player in understanding the effect of the stroke on the ultimate motion of the balls. By following a training regime with exercises designed to exploit the capabilities of the practice ball system of the present invention, a player may improve his or her aiming techniques and also learn how to stroke the cueball to achieve such effects as spin, stun, follow, and draw.

It is therefore a feature of the present invention to provide a practice cueball for training in the playing of pool or pocket billiards. The cueball has a generally spherical outer surface extending about an axis of revolution circumscribed by a central meridian, and is movable along a playing surface from impact by a cue having a tip of a given outer diameter coatable with chalk. First indicia on the outer surface of the cueball define the central meridian which is visually perceptible as the ball is moving along the playing surface for assisting the player in discerning the rotation of the ball.

It is also a feature of the present invention to provide an object ball for training in the playing of pool or pocket billiards. The object ball has a generally spherical outer surface extending about an axis of revolution circumscribed by a central meridian, and is movable along a playing surface from impact by a cueball. A first hemisphere of the ball has an outer surface of a first color, and a second hemisphere has an outer surface of a second color generally contrasting with the first color. The first and second hemi-

sphere meet along a circular locus defining the central meridian which is visually perceptible as the ball is moving along the playing surface for discerning the rotation of the ball.

It is a further feature of the invention to provide a method for training in the playing of pool or pocket billiards which involves the provision of a practice cueball. The cueball has a generally spherical outer surface extending about an axis of revolution circumscribed by a central meridian, and is movable along a playing surface from impact by a cue having a tip of a given outer diameter. First indicia on the outer surface of the cue define the central meridian which is visually perceptible as the ball is moving along the playing surface for discerning the rotation of the ball. With the first indicia of the cueball being aligned relative to the playing surface, the cueball is impacted with the tip of the cue to move the cueball along the playing surface. The rotation of the cueball then is discerned by visually perceiving the motion of the first indicia.

It is yet a further feature of the invention to provide a method for training in the playing of pool or pocket billiards which involves the provision of a practice cueball and object ball. The cueball has a generally spherical outer surface extending about an axis of revolution circumscribed by a central meridian, and is movable along a playing surface from impact by a cue having a tip of a given outer diameter. First indicia on the outer surface of the cue define the central meridian which is visually perceptible as the ball is moving along the playing surface for discerning the rotation of the ball. The object ball has a generally spherical outer surface extending about an axis of revolution circumscribed by a central meridian, and is movable along a playing surface from impact by the cueball. A first hemisphere of the object ball has an outer surface of a first color, and a second hemisphere has an outer surface of a second color generally contrasting with the first color. The first and second hemisphere meet along a circular locus to the central meridian of the object ball which meridian is visually perceptible as the ball is moving along the playing surface for discerning the rotation of the ball. The defined central meridian of the object ball is aligned with an aiming point of the playing surface, with the first indicia of the cueball being aligned relative thereto. The cueball is impacted with the tip of the cue to move the cueball into impact with the object ball. The rotation of the cueball and the object ball are discerned by visually perceiving, respectively, the motion of the first indicia and the defined central meridian.

The invention, accordingly, comprises the apparatus and method possessing the combination of elements and arrangement of steps which are exemplified in the following detailed description. Reference to that description and to the accompanying drawings should be had for a fuller understanding and appreciation of the nature and objects of the invention, although other objects may be obvious to those skilled in the art.

BRIEF DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings wherein:

FIG. **1** is a perspective view showing the practice cueball and practice object ball of the present invention as aligned for a shot on the playing surface of a pool table;

FIG. **2** is a front view showing the practice cueball of FIG. **1** in enhanced detail;

FIG. **3** is a front view showing the practice object ball of FIG. **1** in enhanced detail;

FIG. **4** is a schematic of a top view of the pool table of FIG. **1** showing the practice cueball and object ball of the present invention as aligned with the footspot for center ball aiming and stroking exercises;

FIG. **5** is a schematic of a top view of the pool table of FIG. **1** showing the practice cueball and object ball of the present invention in alignments for aiming and pocketing ball exercises;

FIG. **6** is a schematic of a top view of the pool table of FIG. **1** showing the practice cueball and object ball of the present invention in various alignments for throw shot exercises; and

FIG. **7** is a schematic of a top view of the pool table of FIG. **1** showing the practice cueball and object ball of the present invention in an alignment for stun shot exercises.

The drawings will be described further in connection with the following Detailed Description of the Invention.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIG. **1**, the practice ball system of the present invention is shown generally at **10** as including a practice cueball, shown at **12**, aligned for a shot with a practice object ball, shown at **14**. For illustrative purposes, practice balls **12** and **14** of system **10** are shown as disposed on a standard pool table, at portion of which is shown generally at **16**, having a planar playing surface, **18**, supporting balls **12** and **14**. Looking additionally to FIG. **4**, wherein a top view of table **16** is shown in schematic, playing surface **18** may be seen to be bounded by a pair of side rails, **20***a* and **20***b*, which include side pockets **22***a* and **22***b*, and a pair of end rails, **24***a* and **24***b*, which connect corner pockets **26***a–d*. For purposes of reference, rails **20** and **24** are shown as including diamonds or sights, one of which is enumerated at **28**, and playing surface **18** is shown as marked with a footspot, **30**.

Referring next to FIG. **2**, practice cueball **12** of the present invention is illustrated in enhanced detail, and is revealed to have a generally spherical outer surface, **32**, extending about an axis of revolution, represented at **34**, and circumscribed by a central meridian, represented in phantom at **36**. Looking additionally to FIG. **1**, cueball **12** may be seen to be movable along playing surface **18** of table **16**, which movement may include rolling about an instantaneous axis of rotation, represented at **38** in FIG. **2**, from impact by a cue, **40**, having a tip, **42**, of a given outer diameter. The outer surface **32** of cueball **12** includes first indicia, shown at **44**, which defines central meridian **36**. In accordance with the present invention, first indicia **44** is provided to be visually perceptible as cueball **12** is moving along playing surface **18**. Thus, the player is supplied visual data for discerning the rotation of cueball **12**.

In a preferred embodiment, first indicia **44** comprises a first and second boundary, **46***a* and **46***b*, which defines a section of cueball **12** including central meridian **36**. Indicia **44** therefore is shown as a colored band circumscribed about the outer surface **32** of cueball **12**. To enhance its contrast with the standard white color of the cueball **12** and to highlight chalkmarks thereon, first indicia **44** preferably is provided as a black band which may be painted, printed, inlaid, or otherwise incorporated into surface **32**. As a feature of the invention, the band of indicia **44** may be selected as having a width of about 13 mm (0.51 in) which corresponds to the standard size of the outer diameter of tip **42** of cue **40**. For use with cues, such as those for snooker,

having smaller tips, the width of the band of indicia **44** may be sized proportionately.

For use in training, and as is illustrated best in FIG. **1**, first indicia **44** may be aligned in a generally vertical orientation with respect to playing surface **18** and in registry with an aiming point of the surface such as pocket **26***b* or with object ball **14**. In this way, indicia **44** assists the player in properly aligning the shot, with the selected width of the band improving the focus of the player in shooting "through" the ball. Alternatively, indicia **44** may be aligned in a generally horizontal orientation with respect to playing surface **18**. In whatever orientation indicia **44** is disposed, however, the motion thereof after the stroke, as influenced by the rolling, skidding, sliding, and spinning of cueball **12**, provides the player with valuable visual feedback, such as from a "moiré" or similar pattern, as to the precise effect of the stroke on the resulting travel of the ball. The player may obtain this feedback by visually perceiving the motion of the indicia to discern the rotation of the cueball. In some instances, as with stun shots, the player in fact may observe no rotation, i.e., the non-rotation, of the ball indicating that the ball is skidding or sliding rather than rolling. Such an observation itself is an important indication as to the motion of the ball.

Returning to FIG. **2**, cueball **12** may be seen to additionally include second indicia, shown at **48**, defining a central aiming or reference point on meridian **36**. Preferably, second indicia **48** is provided as a red spot which, as before, is painted, printed, inlaid, or otherwise incorporated into outer surface **32** of cueball **12**. As is shown in FIG. **1**, second indicia **48** may be utilized by the player for more precise aiming and for measurement of center ball hits with tip **42** of cue **40** wherein cueball **12** is made to rotate about axis of rotation **38** (FIG. **2**). After the stroke, the motion of first indicia **44** provides immediate visual feedback to the player as to whether he or she was successful in achieving an intended centerball hit of cueball **12**. It therefore will be appreciated that first and second indicia **44** and **48** function synergistically in facilitating shot alignment and in providing visual information as to the effect of the stroke on the ultimate motion of the ball.

Looking again to FIG. **2**, cueball **12** may be seen to further include third indicia, shown at **50**, which at least partially circumscribes the central reference point defined by second indicia **48**. Third indicia **50** preferably is provided as defining a semi-circular locus which intersects first indicia **44** in extending from a first end, **52***a*, at first boundary **46***a*, to a second end, **52***b*, at second boundary **46***b*. As before, third indicia **50** may be of a contrasting color such as red, and may be painted, printed, inlaid, or otherwise incorporated into outer surface **32** of cueball **12**. So provided, third indicia **50** thus defines an impact region or miscue circle for contact by the tip of the cue effective to rotate cueball **12** about an axis of spin, which may be coaxial, for example, with axis of revolution **34**, and which is disposed generally perpendicular or at some other angle to axis of rotation **38** or playing surface **18** (FIG. **1**). Indicia **50** therefore delineates the limits within which cueball **12** may be stroked to generate useful english or spin. That is, strokes wherein tip **42** of cue **40** (FIG. **1**) impacts cueball **12** outside the impact region defined by third indicia **50** will tend to result in either a miscue or an errant shot. For a standard cueball having a diameter of 2.25 inches (5.7 cm), the critical radius, represented at **54** in FIG. **2**, of the impact region defined by third indicia **50** has been found to be about 0.5625 inch (14.28 mm) as measured from the center of the central reference point defined by second indicia **48**. Again, for smaller cueballs for use in games such as snooker, the diametric extent of indicia **50** may be sized proportionately.

The provision of the aforementioned indicia on the outer surface **32** of cueball **12** additionally assists the player in ascertaining meaningful information from the chalkmark which is typically transferred to the ball at the point of impact with the tip of the cue. As may be better appreciated with particular reference to FIG. **1**, it is common for players to coat the tip of the cue with a layer of a chalk such as calcium carbonate to increase the friction with the surface of the ball. Increasing the friction between the tip of the cue and the surface of the ball is known to reduce the instances of miscue wherein the cue tip slips off the surface of the ball during impact. Normally, a portion of the chalk layer is transferred from the cue tip to the surface of the cueball as a chalkmark. This mark evidences the exact location where the tip of the cue contacted the surface of the cueball. With respect to a standard white cueball, the absence of any reference points on the surface thereof effectively precludes the player from gleaning any meaningful information from the location of chalkmark. With respect to the cueball of the present invention, however, it will be appreciated that the indicia incorporated into the surface thereof provide landmarks from which the location of the chalkmark relative to the aiming point may be obtained, providing the player with valuable information as to whether the actual stroke contacted the cueball where intended and, ultimately, why the balls behaved as they did on the shot in question.

To enhance the visibility of the chalkmark, it is preferred that cueball **12** of the present invention be molded or otherwise formed of a material have a surface texture and other surface characteristics selected to receive the chalkmark from the tip of the cue. In this regard, it has been found that certain thermoset resins, one of which is marketed under the tradename PARTEC™ by the E. Parrella Co. of Medway, Mass., retains chalkmarks appropriately. Such material is to be contrasted with the phenolic resin typically used for billiard balls which produces a ball having a surface which is harder and of a higher gloss than the surface of the ball of the present invention. In all other aspects such as diameter, weight, sphericity, balance, and behavior, however, the performance of the inventive cueball is comparable to that of a standard cueball.

Advantageously, the provision of third indicia **50** as defining a semi-circular locus assists the player in determining the location of the chalkmark relative to the initial orientation of the ball. For example, before the shot, and as is shown in FIG. **1**, cueball **12** may be aligned such that the discontinuous portion of third indicia **50** is oriented towards the bottom portion of the ball. After the shot, the player then may use the indicia as a reference from which may be determined the location of the chalkmark relative to the original orientation of the ball.

Referring next to FIG. **3**, object ball **12** of the present invention is illustrated in enhanced detail to have a generally spherical outer surface, **60**, extending about an axis of revolution, represented at **62**. Outer surface **60** is circumscribed by a central meridian, represented at **64**, which divides ball **14** into a first and second hemisphere, **66***a* and **66***b*, respectively. From impact with a cueball such as cueball **12** of the present invention (FIG. **2**), object ball **14** is movable along playing surface **18** (FIG. **1**), which movement may include rotation about an axis of rotation, represented at **68**. In accordance with the present invention, first hemisphere **66***a* is provided as being of a first color, such as red, with second hemisphere **66***b* being provided as being of a second, contrasting color, such as black. So colored, first and second hemispheres **66** meet along a generally circular locus defining central meridian **64**. As object ball **14** is

moving along the playing surface, the defined central meridian **64** thereof is visually perceptible by the player for discerning the rotation including the non-rotation, i.e., the skidding or sliding, of the ball. If the ball is spinning, a "moiré" or like effect will be developed from which the player may recognize the rotation of the ball.

Returning again to FIG. **1**, the training system of the present invention is illustrated in connection with the utilization of object ball **14** with cueball **12**. In this regard, the defined central meridian **64** of object ball **14** is aligned generally vertically with respect to playing surface **18**, and with an aiming point of playing surface **18** such as pocket **26***b*. First indicia **44** of cueball **12** then may be aligned generally vertically to playing surface **18**, and relative to the aiming point and the defined central meridian **64** of object ball **14**. With cueball **12** and object ball **14** aligned in registration, cue **40** may be stroked to contact with tip **42** thereof the surface **32** of cueball **12** within the miscue circle defined by third indicia **50** such as at the central reference point defined by second indicia **48**. Cueball **12** is thereby made to move along playing surface **18** into impact with aligned object ball **14**. Object ball **14**, in turn, is made to move along playing surface **18** towards pocket **26***b*. The rotation, including the non-rotation, of both cueball **12** and object ball **14** may be discerned by the player for gaining information about the travel of the of the balls by visually perceiving, respectively, first indicia **44** of cueball **12** and the defined central meridian **64** of object ball **14**. After the shot, the chalkmark transferred to cueball **12** may be located by the player relative to the original orientation of the ball by using third indicia **50** as a reference. Thus, by virtue of practice ball system **10** of the present invention, the player is provided immediate and valuable visual information as to aiming and as to the effect of that aim on the ultimate motion of the balls.

The examples to follow are illustrative of exercises which may be included in training regime designed to exploit the capabilities of the practice ball system of the present invention. By following the such a regime, a player may improve his or her aiming techniques, and also learn how to stroke the cueball to achieve such effects as spin, stun, follow, and draw. These examples, however, are only illustrative of the precepts of the present invention, and therefore should not be construed in any limiting sense.

EXAMPLES

Each of the following exercises are designed to teach the player a particular technique or shot. For the maximum training effect with any of the exercises, however, the cueball should be cleaned with a dry cloth prior to each shot. Cleaning the cueball assists the player in identifying chalkmarks, forces the player to concentrate on each individual shot, and also ensures a consistent behavior of the balls.

The balls also should be carefully aimed and aligned such that the player may more easily differentiate between stroke effects and aiming inconsistencies. With reference to FIG. **4**, wherein a top view of table **16** of FIG. **1** is represented in a somewhat schematic fashion, for aiming an aligning cueball **12**, the band defined by first indicia **44** is aligned generally vertically with respect to playing surface **18** and in registry with an aiming point such as footspot **30**. The player is encouraged to view the alignment at different angles to account for any parallax errors. Once the aiming alignment has been confirmed, the ball may be viewed from the side to ensure that second and third indicia **48** and **50** (FIG. **2**) are centered.

For assisting the player in aligning the cueball in an exact vertical or horizontal orientation with respect to first indicia **44**, an alignment tool may be provided as comprising a generally rectangular, planar member having an notched formed into an upper edge thereof. To align the cueball band generally horizontally, the tool is stood on its edge, and the ball is rotated until the spot of second indicia **48** appears in the notch. The edge of the band of indicia **44** then may be aligned in an exact horizontal orientation with the upper edge of the tool. To align the cueball band generally vertically, the tool is stood on an end thereof such that the notch is present to either side instead of the top of the tool.

Similarly, for aligning object ball **14**, the ball is oriented with the defined central meridian **64** thereof generally vertically with respect to playing surface **18**. The ball then may be sighted along the aligned meridian **64** with an aiming point.

Lastly, it is suggested that the player spend equal time mastering both the aiming and stroking techniques to follow. If the aim is straight and true, the system of the present invention will reveal any problems or variations in the stroke. Conversely, if the stroke is straight and true, the system will reveal any problems or variations in the aim. Stroking and aiming techniques therefore are alternated hereinafter to encourage the player to do the same while at the table.

In the following exercises, cue strokes are characterized as "soft," "medium," "hard," or "power." In this regard, the common industry standards regarding stroke power or speed relative to ball travel have been adopted as is shown in the table which follows:

TABLE

Stroke Power versus Ball Travel Distance

Stroke Power	Ball Travel Distance
Soft	1 table length
Medium	2 table lengths
Hard	3–4 table lengths
Power	5 table lengths

Exercise 1

Center Ball Aiming and Stroking

The easiest and best way to aim a cueball is to stroke through its exact center with a level cue directly toward the exact point of aim. With general reference to FIG. **4**, the exercise is begun by placing cueball **12** at the headspot (hidden from view) with indicia **44** generally vertical to playing surface **18** and in alignment with footspot **30**. The ball is rotated such that second indicia **48** (not shown) is in the center of the ball along the line of aim. The player assumes a stance, and the ball is stroked at second indicia **48** through first indicia **44** with, successively, soft, medium, and hard strokes. If first indicia **44** is seen to wobble, an off-center hit is indicated. It is important that the player view the ball both before and after it hits foot rail **24***b* as any wobble is accentuated as the ball caroms off the rail. The other visual indication of an on-center hit is the chalkmark which is transferred to cueball **12**. If the aim was true, footspot **30** will be crossed both before and after the impact of the ball with the rail.

Exercise 2

Object Ball Alignment and Center Ball Hits

With continuing reference to FIG. **4**, cueball **12** is placed on the headspot as was described in connection with Exer-

cise 1. Object ball **14** is placed in the center of table **16**, one diamond **28** from cueball **12**, with its defined central meridian **64** aligned with footspot **30**. The player assumes a stance, and cueball **12** is stroked through second indicia **48** and first indicia **44** to central meridian **64** of object ball **14**. Again, as cueball **12** is moving, the player watches for any wobbling of first indicia **44**. If properly stroked, cueball **12** will stop dead at impact with object **14** with first indicia **44** still in alignment with footspot **30**. After impact, object ball **14** is viewed for any wobble of central meridian **64** both before and after the ball hits foot rail **24***b*. Executed properly, object ball **14** will rebound off the rail, cross footspot **30**, and hit cueball **12** in the center of table **16** sending the cueball back towards the headspot.

Exercise 3

Aiming and Pocketing Balls

Referring next to FIG. **5** and looking initially to ball alignment "A" thereof, object ball **14** is set such that defined central meridian **64** thereof is aligned directly, with corner pocket **26***c*. To properly execute the shot, cueball **12** must be aimed such that it impacts object ball **14** at the nearest point of central meridian **64**. To visualize this point, it is helpful for the player to imagine a "ghost ball," represented in phantom at **70**, adjacent object ball **14**. Cueball **12** is stroked such that it replaces the ghost ball. In theory, object ball **14** will travel into pocket **26***c*, along the line represented at **72** which radiates from central meridian **64**, regardless of its distance or angle from cueball **12**.

Unfortunately, however, as the surfaces of the two balls collide and slide across one another, the resulting friction develops a drag called "throw" which pushes the object ball off of line **72**. As is illustrated in ball alignment "B," this throw component of force will be vectored in the direction of cueball motion and will push object ball **14** at some angle thereto along, for example, the line represented at **74**. Indeed, throw may alter the cut angle of a shot by as much as 5°, an effect which is magnified by distance on longer shots. To compensate for throw, object ball **14** may be aligned as in alignment "A" with the center of the pocket to move the cueball target and achieve a slightly thinner ghost ball hit. Alternatively, object ball **14** may be aligned as in alignment "B" to the outside of the pocket with a flush ghost ball hit.

Exercise 4

Throw Shots

Three separate practice shots, represented by object balls **14'**, **14"** and **14'"**, may be arranged as is shown in FIG. **6**. The defined central meridian **64** of each of object balls **14** is aligned with the center of pocket **26***c* from each of the three marked positions. First indicia **44** of cueball **12** is aligned with the center of a "ghost ball" visualized adjacent each of object balls **14**. Each shot is executed without adjustment for throw, and the results are observed from the motion of the balls and the chalkmarks transferred to cueball **12**. It will be observed that the effects of throw increase proportional to the cut angle and the distance of the object ball from the pocket, and that softer strokes generate more throw than harder strokes. The exercise may be repeated at each object ball position at successively greater distances from the cueball. Once each shot on the left side of table **16** has been properly executed, this exercise, as with all exercises, may be repeated from the right side of table **16** to ensure that the player develop a balanced table presence.

Exercise 5

Spin, Squirt, and Curve

The addition of a spin or "english" component to the motion of the cueball complicates the shot and therefore is to be avoided unless absolutely necessary. One of the great ironies of pool is that the better the player, the less the player needs to rely on spin to execute a shot. However, while demanding greater skill, the use of spin affords good players many options for shot making and position play, the mastery of which is necessary to truly excel at the game.

The practice ball system of the present invention provides the player with valuable visual signals relating to the spin of the ball. In this regard, cueball **12** is set on the headspot, aimed with the footspot, and aligned such that first indicia **44** is vertical and second indicia **48** defines the center ball aiming point. The player then strokes the ball at the right edge of first indicia **44** with a soft, level cue to impart a right spin component to the motion of the ball. It will be observed that the cueball "squirts" to the left of its desired path, and then curves slightly back towards the target. The exercise may be repeated at varying cue speeds from both the right and left side of the ball, and with an elevated cue. The distance from first indicia **48** at which the cueball is stroked also may be varied so that the player study the effects of spin on aim and on position.

Unfortunately, the amount and squirt and curve of a spinning cueball is impossible to quantify. That is, the magnitude depends not only on the stroke speed and aiming point, but also on such variables as the flexibility of the cue and the curvature of the tip.

Exercise 6

Effect of Spin on Position

Although squirt and curve are generally to be considered as necessary evils, spin can be a great ally in position play. To demonstrate the effect of spin on position, cueball **12** is set up and executed as was described in connection with Exercise 5, with a marker placed at where the ball stops or hits the rail. The exercise may be repeated for at varying cue speeds, and from both the right and left side of the ball. If the same spot on the cueball is hit and the aim is proper, it will rebound off the rail at a consistent rebound angle for a given cue speed. In this way, the player may understand how just a little spin effects the rebound angle, especially with a soft cue stroke.

Exercise 7

Spin Angles Off the Rail

Using the same set up as was described in connection with Exercises 5 and 6, cueball **12** is stroked at progressively greater distances from the center ball aiming point defined by second indicia **48**, the outer boundary being defined by miscue circle of third indicia **50**. The exercise is repeated with soft, medium, and hard strokes. The player will realize that stroking the ball at progressively greater distances from its center has proportionately less effect on the rebound angle, but makes it increasingly difficult for the player to be accurate. Thus, a point of diminishing returns is reached defining the outer limits of useful english. With practice, the player will become able to predict the angle of the ball off the foot rail for any given stroke speed and amount of spin.

Exercise 8

Outside and Inside Spin Off the Rail

With a knowledge of how the speed of the shot affects the rebound angle off the foot rail, and how soft strokes increase

and hard strokes decrease the angle, the player is ready to attempt some shots. In this regard, the cueball is placed as was described in connection with Exercises 5, 6, and 7, with the point of indicia **48** centered and the band of indicia **44** vertical. The ball is aimed at first diamond left of the right corner pocket, and stroked in the center with a soft cue. The chalkmark and wobble are checked to ensure that the center of the ball was hit, along with the angle of the ball off the back and side rails and its ending position. The shot is repeated with the same velocity, but with a point of aim on the cueball at the right edge of the band of indicia **44**. Once again, the player checks the chalkmark and notes the angles of return and the position of the stopped ball.

The above exercise demonstrates the effects of, variously, "outside," "natural," or "running" english. Outside refers to the way the spin relates to the object ball, i.e., the contact point of the cue tip on the cueball is "outside" or away from the ball. Natural english refers to the natural effect of hitting a rail which is to impart spin to the cueball in the direction of the angle. Running refers to the phenomenon of the cueball gaining speed when it strikes the rail to "run" farther than its initial speed would suggest. The opposite effect is termed, variously, "inside," "reverse," or "hold-up" spin. To understand this effect, the player may execute the same shot, but with a point of aim to the left edge of the band defined by first indicia **44**. Not surprisingly, the effects are opposite, viz., the rebound angles off the foot and side rails are smaller, and the ball stops shorter.

Exercise 9

How Object Balls Affect Cueball Spin

The final component necessary for the player to understand spin and to use it judiciously is to examine what happens when a spinning cueball strikes an object ball. Cueball **12** is placed about a foot (30.5 cm) from the left side pocket, with object ball **14** placed in the center of the table. The cueball is aligned with the spot of second indicia **48** in the center and with the band of first indicia **44** vertical. With a medium stroke and right spin, the object ball is pocketed. If the shot was executed properly, the cueball will remain in the center of the table spinning like a top well after the object ball has been pocketed. Thus, two phenomena are revealed: that the object ball does not affect the spin of the cueball on a flush, full-ball hit; and that the rotational energy or spin on the cueball can continue even after the forward rotational energy or roll has stopped. The former phenomenon explains why spin continues to be a factor in cueball behavior and affect position play even after an object ball has been struck. The latter phenomenon explains why balls with running spin actually gain speed off a rail as the rotational energy is convened into forward energy.

Exercise 10

Transfer of English

To understand the effects of what happens to the object ball when struck by a spinning cueball, cueball **12** is placed on the headspot with object ball **14** placed in the center of the table about a foot (30.5 cm) from the cueball with defined central meridian **64** aligned to cross footspot **30**. The object ball is struck flush with a right spinning cueball, and the results are observed. The player will appreciate that the object ball wobbles in the direction opposite the spin of the cueball. In effect, the transfer of spin or english from the cue affects the object ball the same as throw. The exercise may be repeated with varying spin and power.

The transfer of spin has practical applications for bank shots in increasing the possible ways to make a shot by opening or shortening angles off the rail. The throw effect allows the player to increase or decrease the cut angle on a shot, while still pocketing the object ball, and thereby provides alternatives in position play. This "cheating" of the ball also affords the player a capability to make "close-but-impossible" shots such as when another object ball is slightly blocking what would be a "natural" center ball aiming. The spin can sometimes throw the ball far enough for it to be pocketed regardless.

Exercise 11

Natural Roll and Stop Shots

To determine how the cueball skids and rolls, cueball **12** is placed on the head spot with the spot of second indicia **48** centered, but this time with the band defined by first indicia **44** oriented horizontally rather than vertically with respect to the playing surface. The ball is stroked straight with medium speed and closely observed. The first and second indicia should be seen to maintain their initial orientation for the first few feet of ball travel, proving that the ball is actually skidding rather than rolling. When the ball thereafter assumes a rolling motion, the band will be observed to roll over the top of the ball. The shot may be repeated using center ball hits with soft, medium, and hard strokes.

Next, object ball **14** may be included for the player to understand how the ability to control how far the cueball skids leads to a very valuable shot, namely, the stop shot. The cueball is aligned as previously, with the object ball spaced two feet (61 cm) therefrom and aligned with a corner pocket. The object ball then is pocketed with a center ball hit of the cueball at a medium stroke speed. The cueball should be observed to stop dead when it hits the object ball, effectively "stunned" into submission. The shot may be repeated with harder and softer strokes with the same effect. It will be seen that the cueball may be stunned on a flush hit regardless of its speed. That is, as long as the ball is skidding without topspin or back spin, it will stop dead with a flush hit of an object ball.

Exercise 12

Stun Shots

As a skidding ball, unlike a top or backspinning ball, will rebound at a precise, predictable geometric angle, the information learned in Exercise 11 proves invaluable for angle shots. That is, when a stun shot is hit, the travel of the cueball after its impact with an object ball is much more predictable.

For practicing stun shots, the balls are aligned as was described in connection with Exercise 12 with the object ball placed at successively greater distances from the cueball. The objective is for the player to pocket the object ball while stunning the cueball, and to learn just how softly the cueball may be stroked to still achieve the desired stun effect. Thus, the shot is begun with medium to hard strokes, and repeated with softer strokes. As the length of the shot is increased, the player will observe that the cueball must be struck either harder or lower. The player who can stun the ball at a distance is well on the way to a better mastery of the game.

Exercise 13

Stun Shots at Angles

Cueball **12** is placed again on the headspot, but object ball **14** is set as is shown in FIG. **7** at an angle of about 30° to

the cueball with defined central meridian **64** aligned with the center of corner pocket **26***b*. A line, represented at **80**, is visualized perpendicular to the path of the object ball from a ghost ball **70** to side rail **20***a*, and is marked with a marker, **82**, such as a piece of chalk or the like. Marker **82** marks the spot where the cueball will strike the rail assuming a properly executed stun shot. The player is challenged to both pocket the object ball and have the cueball hit rail **20***a* at marker **82**. As always, the shot should be repeated at varying speeds and distances. After this exercise the player will appreciate the true beauty of a stun shot, namely, that the cueball will always travel perpendicular to the path of the object ball.

Exercise 14

Follow

Before proceeding with Exercise 14, Follow, and Exercise 15, Draw, it should be noted that mastery of two elements is required for proper execution of these shots. Firstly, the cueball must be struck at the proper location—upper for follow and lower for draw. Secondly, cue tip speed and a level cue are required.

For practicing follow shots, cueball **12** is placed on the headspot with the spot of second indicia **48** centered and the band of first indicia **44** vertical, and with object ball **14** spaced about 2 feet (61 cm) therefrom. The player begins by hitting medium speed shots just above the spot of second indicia **48**. The chalkmark is checked, and the cueball is observed to determine how far, if at all, it follows the travel of the object ball. The striking distance above the center spot is increased and the results are noted for both harder and softer strokes. The distance between the cueball and object ball is increased, and the exercise is repeated. As before, the objective is for the player to learn how softly and how close to the center aiming point the cueball may be struck while still achieving the desired follow effect.

Exercise 15

Draw

The balls are aligned as was described in connection with Exercise 14, and that Exercise is repeated except that the cueball is struck at distances below the central aiming point defined by second indicia **48**. The player may be amazed to learn the difficulty in hitting the cueball outside or even close to the edge of the semi-circle defined by third indicia **50**. The player also may be amazed at the effect which may be achieved with only a relatively small degree of off-center hit but a relatively good stroke.

Once Exercises 14 and 15 have been performed with some degree of confidence, they may be repeated in connection with a selected aiming point. For example, the player may place a marker two feet (61 cm) past and just off line of the aim. Using soft, medium, and hard strokes, the player may try to follow the cueball to stop next to the marker. The same may be attempted for draw strokes with the marker placed two feet (61 cm) in front of the object ball.

In summary, the practice ball system of the present invention as described in the preceding description and exercises will improve aiming techniques and the detail the effects of achieving spin, stun, follow, and draw. The system, advantageously, functions well in combining these effects, and the player is encouraged to practice them in combination such as high right or low left aiming points on the cueball. With a little practice, the player will notice both an improved confidence and increased knowledge of the game. The practice cueball of the present invention also may be utilized in conjunction with the playing of familiar pool games such as eight-ball, nine-ball, or straight or target pool. The ball may be aligned for each shot without changing its location on the table. After each shot, the results may be noted and the chalkmark examined. The visual feedback which may be gained under real game conditions as approved to be invaluable. Lastly, the system may be used to master the infrequent but especially difficult shots of the pool expert such as shooting at the cueball with an elevated bridge, the massé, and the jump shot. By aligning the band and spot on the cueball, the player may improve his or her aiming techniques and learn exactly which angles will produce varying levels of jump and curve.

It is anticipated that certain changes may be made in the apparatus and method described hereinbefore without departing from the scope of the invention herein involved. For example, the dimensions referred to herein relate to the standard size of American balls and cues. Other pool games, such as snooker, employ smaller balls and smaller cue tips such that measurement of all indicia would change proportionately for practice cue and object balls of the present invention intended for those games. Accordingly, it is intended that all matter contained in the foregoing description of the invention or shown in the accompanying drawings shall be interpreted as illustrative rather than in a limiting sense.

What is claimed:

1. A practice cueball for training in the playing of pool or pocket billiards having a generally spherical outer surface extending about an axis of revolution and having a central meridian, said cue ball being movable along a playing surface as a result having impact by a cue having a tip of a given outer diameter and coatable with chalk, said cueball comprising:

first indicia on said outer surface defining a single band having parallel spaced apart boundaries symmetrically disposed about said central meridian, said band having a width corresponding with said tip outer diameter and being visually perceptible as said ball is moving along a playing surface;

second indicia on said outer surface defining a cue aiming point on said meridian; and

third indicia on said outer surface defined by a circular locus of a critical radius extending from said second indicia cue aiming point and defining an impact region therewithin for impact by said tip of said cue.

2. The cueball of claim **1** wherein said third indicia locus terminates at oppositely disposed locations of said band parallel boundaries.

3. The cueball of claim **2** wherein:

said cueball has a diameter of about 2.25 inches; and

said critical radius has a value of about 0.5625 inch.

4. The cueball of claim **1** wherein said:

said cueball has a diameter of about 2.25 inches; and

said first indicia has a width between said parallel boundaries of about 13 millimeters.

5. The cueball of claim **4** wherein said first indicia is black and said second indicia is red.

6. The cueball of claim **5** in which said third indicia is red and the surface of said cueball is white.

7. The cueball of claim **1** wherein said second indicia is located within said third indicia is located within said third indicia.

8. The cueball of claim **1** which is formed of a material having surface characteristics selected to receive and removably retain a chalkmark from the cue tip.

9. A method for training in the playing of pool or pocket billiards comprising the steps of:

(a) providing a cueball having a generally spherical outer surface coatable with chalk, and extending about an axis of revolutions and having a central meridian, said cue ball being movable on a playing surface as a result of impact by a cue having a tip of a given outer diameter, said cueball including:

first indicia on said outer surface defining a single band having parallel spaced apart boundaries symmetrically disposed about said central meridan, said band having a width corresponding with said tip outer diametr and being visually perceptible as said ball is moving along a playing surface;

second indicia on said outer surface defining a cue aiming point on said meridian; and

third indicia on said outer surface defining a circular locus of a critical radius extending from said second indicia central reference point and defining an impact region therewithin for impact by said tip;

(b) aligning said first indicia relative to said playing surface; and

(c) impacting said cueball with the tip of a cue to move said cueball along said playing surface; and

(d) discerning the rotation of said cueball by visually perceiving the motion of said first indicia.

10. The method of claim 9 wherein said first indicia is aligned in step (b) generally vertical to the playing surface and in registry with an aiming point of the playing surface.

11. The method of claim 9 wherein said first indicia is aligned in step (b) generally horizontal to the playing surface.

12. The method of claim 9 wherein:

said step (c) is performed by stroking said cue at said second indicia; and

including the step of (e) subsequently observing the location of a chalk mark on said cueball.

13. The method of claim 9 wherein said cueball is impacted in step (c) within said impact region at a select distance from said aiming point to rotate said cueball about an axis of spin disposed at some angle with respect to the playing surface.

14. A method for training in the playing of pool or pocket billiards comprising the steps of:

(a) providing a cueball having a generally spherical outer surface extending about an axis of revolution and having a central meridian, said cueball being movable along a playing surface from impact by a cue, said cue having a tip of a given outer diameter, said cueball including first indicia on said outer surface defining said central meridian;

(b) providing an object ball having a generally spherical outer surface extending about an axis of revolution and having a central meridian, said object ball being movable along the playing surface from impact by said cueball, said object ball comprising a first hemisphere having an outer surface of a first color, and a second hemisphere having an outer surface of a second color different from said first color, said first and second hemisphere meeting along a circular locus to define said central meridian of said object ball;

(c) aligning the defined central meridian of said object ball with an aiming point;

(d) aligning said first indicia of said cueball relative to the defined central meridian of said object ball;

(e) impacting said cueball with the tip of a cue to move said cueball along the playing surface into impact with said object ball;

(f) discerning the rotation of said cueball by visually perceiving the motion of said first indicia; and

(g) discerning the rotation of said object ball by visually perceiving the motion of the defined central meridian of said object ball.

15. The method of claim 14 wherein said first color is black and said second color is red.

16. The method of claim 14 wherein the defined central meridian of said object ball is aligned in step (c) generally vertical to the playing surface.

17. The method of claim 16 wherein said playing surface includes at least one pocket and the defined central meridian is aligned in step (c) with the pocket.

18. The method of claim 16 wherein said first indicia of said cueball is aligned in step (d) generally vertical to the playing surface.

19. The method of claim 18 wherein said first indicia of said cueball is aligned in step (d) in registry with the defined central meridian of said object ball.

20. The method of claim 14 wherein said cueball is provided in step (a) with second indicia on said outer surface defining a central reference point on said meridian, and wherein said cueball is impacted in step (e) at said central reference point.

21. The method of claim 14 wherein said cueball is provided in step (a) with third indicia on said outer surface at least partially circumscribing said aiming point to define an impact region, said cueball being impacted in step (e) within said impact region effective to rotate said cueball about an axis of spin disposed at some angle with respect to the playing surface.

* * * * *